

REMARKS

Claims 1-65 are currently pending; however claims 32-48 and 62-65 have been withdrawn from consideration pursuant to a restriction requirement. Pursuant to the present response claim 49 has been amended, claims 32-48, 51 and 60-65 have been cancelled and new claims 66-80 have been added to the present application. It is noted that no new matter will be incorporated into the present application by entry of this Amendment. If the Office determines that any additional fees are deemed to be necessary with the filing of this Amendment, then the Office is authorized and requested to charge such fees to Deposit Account No. 061910.

The Examiner has required restriction to one of the following inventions under 35 U.S.C. § 121:

- I. Claims 1-31, 49-61 stated by the Examiner as being drawn to Method and Apparatus for Non-linear Bone Measurements; or
- II. Claims 32-41, 44-48 stated by the Examiner as being drawn to Methods for Shear Wave Lamé Coefficient or Shear Wave Velocity Determination; or
- III. Claims 42-43, stated by the Examiner as being drawn to Method for Combined Pressure and Shear Wave Bone Measurements; or
- IV. Claim 62, stated by the Examiner as being drawn to Angulated Arrival Time Speed of Sound Measurement.

In response to the restriction requirement, Applicants, through their attorney, provisionally elect the invention of Group I (claims 1-31, 49-61) with traverse.

The claims of Groups I-IV meet the requirements for consideration in a single application, *inter alia*, in that they each relate to measuring bone conditions using ultrasound measurements. Further, Applicants traverse the restriction requirement on the grounds that no serious burden on the Examiner exists. If the search and examination of an entire application can be made without serious burden, it must be examined on the merits even though it includes claims directed to distinct or independent invention. M.P.E.P § 803. The subject matter of Groups I-IV are believed sufficiently related that a thorough search for the subject matter of either group would encompass a search for the subject matter of both groups. To

avoid duplicative examination by the Patent Office and unnecessary delay and expense to Applicants, Applicants respectfully request a determination that all the originally filed claims should be considered in a single application, not just those of Group I. Upon such a determination, the Applicant respectfully reserves the right to resubmit the claims identified in Groups II-IV.

The Examiner has indicated that claims 16-17 and 29-30 would be allowable if rewritten in independent form. Applicant thanks the Examiner for the indication of allowable subject matter.

The Examiner also objected to claim 61, stating that it is a substantial duplicate of claim 60. The applicant respectfully traverses this objection and points out that a system may include a multitude of elements, including one or more devices, systems operations and/or processes for using and operating such devices. Alternatively, a device is usually limited to an apparatus, systems operations and or processes for using and operating that particular apparatus. Regardless, in an attempt to expedite prosecution of the above-identified applications, claims 60 and 61 have been cancelled and new claims 66-80 have been added, which are directed only to a system. It is noted that the applicant reserves the right to proceed with cancelled claim 60 and related claims in subsequently filed continuation applications.

The Examiner rejected claims 1-3, 18-20, 49-50, 52-53, 55 and 60-61 under 35 U.S.C. 102(b) as being anticipated by USPN 5,259,384 to Kaufman et al (hereinafter "Kaufman"). Also, the Examiner has rejected claims 4-7 under 35 U.S.C. 103(a) as being unpatentable over Kaufman and further in view of USPN 6,322,507 to Passi et al (hereinafter "Passi") or USPN 6,213,958 to Winder (hereinafter "Winder '958"); rejected claims 8-14 under 103(a) as being unpatentable over Kaufman and further in view of Winder '958, further in view of USPN 5,903,516 to Greenleaf et al. (hereinafter "Greenleaf"); rejected claim 15 under 103(a) as being unpatentable over Kaufman and further in view of Winder '958 and Greenleaf, further in view of Passi; rejected claims 21 and 56 under 103(a) as being unpatentable over Kaufman and further in view of USPN 4,913,157 to Pratt et al. (hereinafter "Pratt"); rejected claims 23-24 and 58-59 under 103(a) as being unpatentable over Kaufman and further in view of Greenleaf alone or further in view of USPN 6,585,647 to Winder (hereinafter "Winder '647"); rejected claim 28 under

103(a) as being unpatentable over Kaufman and further in view of Pratt and further in view of Greenleaf; rejected claim 31 under 103(a) as being unpatentable over Kaufman and further in view of Pratt and further in view of Passi or Winder '958; rejected claim 51 under 103(a) as being unpatentable over Kaufman; rejected claim 15 under 103(a) as being unpatentable over Kaufman and further in view of USPN 5,592,943 to Buhler at al. (hereinafter "Buhler").

Applicant respectfully disagrees with the above-identified rejections of these claims and the characterization of the Kaufman reference and respectfully points out that the cited references by themselves or in combination do not disclose or suggest all of the limitations of the present claims. Applicant respectfully traverses the Examiner's rejection of the claims and requests reconsideration.

It is well established that to sustain a rejection under 35 U.S.C. § 102(b), a single prior art reference has to meet every limitation of the claimed invention. In re Paulson, 30 F.3d 1475, 31 USPQ 2d 1671 (Fed. Cir. 1994); Akzo N.V. v. U.S. International Trade Commission, 808 F.2d 1471, 1 USPQ 2d 1241 (Fed. Cir. 1986); Hybertech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 231 USPQ 81 (Fed. Cir. 1986). If an independent claim is non-obvious and novel then any claim depending therefrom is non-obvious and novel because it contains all limitations of the independent claim plus a further limitation. Hartness International, Inc. v. Simplimatic Engineering Co., 819 F.2d 1100, 2 USPQ2d 1826 (Fed. Cir. 1987). Therefore, to sustain a rejection under 35 U.S.C. §102(b) in the present application of claims 12, 13 and 17-19, as well assert a rejection of new claims 21-26, a single reference would have to teach each of the limitations present in independent claims 12, 17 and 24. The previously cited reference (de Bruijne) does not satisfy this requirement.

In addition, the Examiner bears the initial burden in establishing a prima facie case of obviousness when rejecting claims under 35 U.S.C. §103. In re Piasecki, 745 F.2d 1468, 223 USPQ 758 (Fed. Cir. 1985); In re Reuter, 651 F.2d 751, 210 USPQ 249 (CCPA 1981). If the Examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of non-obviousness.

Similar to the requirements for rejection of claims pursuant to 35 U.S.C. 102(b), in order to establish prima facie obviousness of a claimed invention, the Examiner must show that all the claim

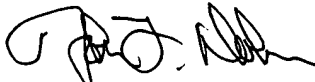
limitations are taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). If an independent claim is nonobvious, then any claim depending on that claim is also nonobvious. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Independent claims 1, 25, 49 and new independent claim 66 are novel and not obvious in view of Kaufman and the other cited references since none of these references disclose all of the limitations cited in these claims of the present application. For example, claim 1 calls for “determining the degree of acoustic nonlinearity of the bone”, claims 25 and 49 call for “measuring the degree of acoustic nonlinearity of the bone” and claim 66 calls for “a control system configured to determine the degree of acoustic nonlinearity of the bone”. Kaufman measures how frequencies are weighted from input to output spectrum, a linear process. Kaufman does not measure frequencies that were present in the output spectrum that were not present in the input spectrum, a non-linear process. Kaufman’s statement “the present inventors have found that the attenuation versus frequency relation for bone is non-linear” (Col. 2, lines 46-48) is not describing acoustic nonlinearity. Rather, Kaufman suggests that the frequency domain weighting function between input and output spectra is non-linear. Kaufman still teaches a linear process, although the transfer function is non-linear in frequency. As previously mentioned, the present application claims methods and systems that incorporate acoustic nonlinearity. For example, rather than measuring the output of the same frequency or frequencies that were initially transmitted, embodiments of the present invention determine the output of different frequencies, such as the harmonic frequencies. Thus, for at least these reasons, Applicant believes independent claims 1, 25, 49 and 66 and claims depending thereon are patentable over Kaufman by itself or cited in combination with the other references and respectfully requests that the Examiner withdraw the rejections.

In view of the foregoing, it is submitted that claims of application are in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,



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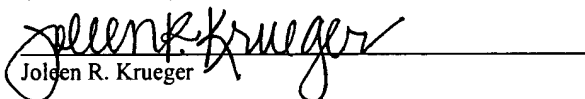
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